Appendix H
Glossary

Antireverse (Backstop) Device - A device mounted on the pump driver, either on the motor shaft or the gear reducer shaft, that will prevent reverse rotation of the pump. This device protects the pump driver from damage. It is especially important for engine drives. When installed on a gear reducer unit, it is recommended, for ease of maintenance, that it be installed on the output shaft.

Axial Flow Pump - Sometimes called a propeller pump. Flow enters impeller axially and discharges nearly axially. It develops most of its head by a lifting action of the vanes of the impeller on the liquid. Specific speed is typically above 9000. Large capacity at low head. Total head is less than 20 feet.

Cavitation - The formation of vapor bubbles caused when the local absolute pressure falls to or attempts to fall below the vapor pressure of the liquid moving through the pump. Damage occurs when the bubbles collapse against the surfaces of the impeller or casing causing a loss of metal.

Centrifugal Pump - A general classification of pumps in which pumping of liquids or generation of pressure is effected by the rotary motion of the impeller. This classification does include axial flow pumps, but for our purposes, we will define it as a pump in which impeller discharge flow is in the radial direction and pressure is developed principally by the action of centrifugal force. Pumps with single inlet impellers have a specific speed below 4000, and with double suction impellers below 6000.

Critical Speed - Critical speed occurs when the pump rotates at its natural frequency. At this speed or speeds, minor unbalances are magnified.

Energy Gradient - The plot of total head at various locations along a pumping system with respect to a datum.

Friction Head - The pressure required to overcome the frictional resistance of a piping system to liquid flow.

Hydraulic Gradient - Shows the static pressures at various locations along a pumping system. The difference between the energy gradient line and the hydraulic gradient line is the velocity head in the pipe at that point.

Mixed Flow Pump - Flow enters axially and discharges in an axial and radial direction. The head developed is partly by centrifugal force and partly by the lift of the vanes on the liquid. Specific speed is typically from 4000 to 9000. Large capacity at moderate head. Total head can be as high as 50 feet.

Net Positive Suction Head (NPSH) - The minimum suction conditions required to prevent cavitation in a pump. It is defined as the total suction head in feet of liquid absolute determined at the suction nozzle and referred to datum less the vapor pressure of the liquid in feet absolute. The pumps required NPSH (NPSHR) is determined by test and will be stated by the manufacturer. The available NPSH (NPSHA) is calculated based on the installation and must be at least equal to the NPSHR.

Siphon - A pipe or closed conduit that rises and falls. When there is no net change in elevation, no pumping head is required to sustain flow except to overcome friction and minor losses. The siphon must flow full and free of liquid vapor and air. The limiting height of the siphon for complete recovery is dependent upon the conditions that will cause vaporization of the liquid.

Specific Speed - A dimensionless quantity used to classify pump impellers with respect to their geometric similarity. It is a correlation of pump capacity, head, and speed at optimum efficiency.

Static Head - A fixed system head that does not vary with the rate of flow. It is the difference of the discharge elevation or pressure and the suction elevation or pressure.

Submergence - The distance from the impeller eye to the minimum free water surface in the sump. Some manufacturers defined it from the bottom of the suction bell to the minimum water surface elevation in the sump.

Submersible Pumps - Submersible motor-driven wet pit pumps have an electric submersible motor close coupled to the impeller of the pump. Both the motor and pump are submerged. This arrangement is typically more compact and simplified than a conventional pump. The need for a long shaft to couple motor to pump is eliminated.

Suction Specific Speed - A dimensionless quantity used to classify pump impellers based on suction characteristics. The formula is similar to specific speed except that instead of using total head, the net positive suction head required is used.

Total Dynamic Head - (Total Head) - The measure of the work increase per pound of liquid, imparted to the liquid by the pump. From the general energy equation, the total dynamic head (total head) is the difference of the discharge head, as measured at the discharge nozzle and referred to the pump shaft centerline, and inlet or suction head, as measured at the suction nozzle and referred to the same datum and the difference in velocity heads at the discharge and suction nozzles.

Total Suction Head - The height of water from the centerline or eye of the impeller to the water surface in the sump. The term "total suction lift" is used when the water surface elevation is below the eye of the impeller and is defined as the height from the water surface to the centerline or eye of the impeller.

Velocity Head - The kinetic energy in a mass of flowing liquid per unit weight of the liquid.